Ferguson Structural Engineering Lab Newsletter

THE UNIVERSITY OF TEXAS AT AUSTIN - STRUCTURAL ENGINEERING

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New Mascot: Lil' Guy?

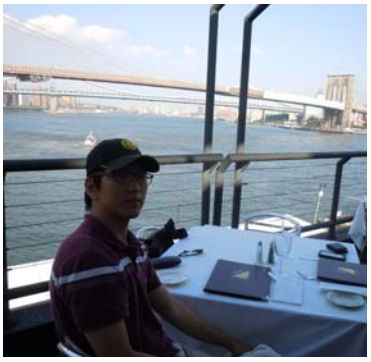
At the beginning of 2012, FSEL had a visitor: Lil' Guy. The baby possum slipped into the lab during business hours and was having quite the time exploring the vast amount of nooks and crannies that exist. His presence would not go unnoticed nonetheless, especially to the big, observant grad students around the lab (top picture). Seeing such tall predators, Lil' Guy ran away scared (and who would not be??) and tried to hide in a safe spot along the strong wall. His efforts were futile as he was later captured (bottom picture). Lil' Guy was later transported to a field inside of PRC, just east of FSEL, where he could grow and live in peace. Bye Lil' Guy!

New Faces at FSEL

Kostas Belivanis

I was born in Paris, France, and raised partially in France and Greece, before finally settling in at the magnificent island of Crete. After attending the Aristotle University of Thessaloniki and a year of work in Paris, the time came to attend UT and conduct research at FSEL. My name means constant, and recently I have been constantly trying to overcome the jinx I have! My hobbies include sports, music, poetry, and math.

Changhyuk Kim



I was born and raised in South Korea. I got my BS and MS degrees from Inha University in Korea. I came to Austin in July of 2010 and I started on a project last winter. In my spare time, I really enjoy swimming and tennis. I hope to make many friends at FSEL.

Anthony DeFurio

I grew up in Tampa, FL, and got my BS with a focus on Structural Engineering at the University of Florida during the reign of Tebow. Before I came to UT, I worked for a while at a geotech looking for sinkholes. I am a big fan of the Packers and the Rays.

Inside this issue:

More New Faces at FSEL....

Whitney Lee

I was born and raised in McAllen, TX, and often miss the border's Mexican food. I attended UT for my undergrad. Before I graduate (again), my goal is to achieve at least one intramural championship or I may have to consider getting a PhD sometime down the road. I am happily engaged to Samantha Wiley and plan to move to California upon my graduation.

Hemal Patel

I hail from the flat cornfields of Champaign -Urbana, where I spent my undergraduate years at the University of Illinois. I will always be a Fighting Illini at heart, but am glad to be a Longhorn too! Initially, I could not make the longhorn sign, but I stretched out my pinky finger and now have impeccable form. I love Disney movies, Hindi music, and playing any kind of sport, especially golf, mini-golf, and basketball. Two unintended defense mechanisms of mine are my bony elbows.

Alissa Neuhausen

I grew up north of Chicago in the suburb of Highland Park. After high school, I moved to Northern California to attend school at UC Berkeley where I graduated in 2010. At UT, I am working on a dual master's in engineering and public affairs. Outside of school I frequent good restaurants around the Austin area. I also enjoy playing tennis and volleyball or traveling in Central and South America when I'm not learning or working.

Daniel Sun

Born and raised in the northeastern part of China, I do know how to enjoy freezing cold weather . FSEL is amazing to me because I can discover new knowledge by destroying things! Though I cannot ski in Austin, I do enjoy soccer, tennis, volleyball, and FSEL. If you happen to enjoy one of these activities, I might be your next friend.

Joshua Ramirez

I was born in San Antonio, TX, but I was raised further south on Texas' ranches. I received my BS at UT and after a rough year out in the real world, I decided to come back to get my MS. I love family, ranching, and recreational activities.

Corrosion Resistance of New PT Systems - Kevin Moyer & Michael Weyenberg

In March, when the birds are chirping and the kites are flying, the sound of a concrete saw and jack-hammer will be heard at the south end of FSEL signifying the destruction of the concrete beams (shown to the right) and the start of the long process of rating the corrosion of post-tensioning components of the specimens. It also signifies the end of a six-year project started by Michael Ahern and continued by Ryan Kallina, Sean Mac Lean, Greg McCool, and ending with me, Kevin Moyer.

The project is an accelerated -corrosion study of various components of post-tensioned concrete and different anchorages. Approximately six years ago, beams containing various PT component combinations were constructed according to TxDOT standards and are currently being exposed to a 3.5% salt solution by a spray system to simulate the splash zone in a coastal region and by wet-dry cycles in basins formed in the tops of the beams to simulate a corrosive environment that is likely to occur in de-icing operations and/or coastal regions.

The specimens survived the long, "cold" Texas winter just to be cut and jack-hammered apart

Passive Wireless Conductivity Sensors - JinYoung Kim

One of the major problems facing the concrete industry is the durability of concrete infrastructures. Therefore, structural health monitoring of RC structures can be a major advantage. Electrical conductivity can be an indicator of concrete properties and thereby provide information on structural performance. To monitor the conductivity of concrete structures, a passive, wireless and inexpensive sensor was developed. However, a limitation of the previous conductivity sensors is that the probe is susceptible to damage during concrete placement. The research team has developed the 2nd generation conductivity sensor, a non-contact conductivity sensor, in which a metal element is positioned above the sensor body but is not connected to the resonant circuit within the sensor. The 2nd generation conductivity sensor does not have damaging probes, is easy to fabricate, and is able to measure a broader range of conductivity.

NEW HOT Fashion trend for spring / summer 2012!

Anchorage-Controlled Shear Capacity of Prestressed Concrete Bridge Girders - David Langefeld

Two Tx46s were fabricated and tested at FSEL, each with around 35% debonding. This limited testing has demonstrated that girders with wider bottom flanges and thinner webs are less susceptible to anchorage failures. The absence of flexure, shear, or flexure-shear cracks crossing the strands near the end of the beam precludes an anchorage failure. The critical crack is more likely to occur at the web-flange interface (horizontal shear). In addition, this research has demonstrated that AASHTO Equation 5.8.3.5-1 does not adequately predict anchorage failures.

Cracked Panels - Kiyeon Kwon, Aaron Woods, Umid Azimov

Lets start casting!!

Fibers in action

During the fall semester, we focused our efforts on conducting restrained shrinkage tests. Through this test, we explored the application possibilities of the derived design alternatives for top-mat portion, especially for the transverse direction, considering the interaction of a CIP concrete slab and PC panels. Test variables were (i) standard TxDOT design, (ii) reduced reinforced, and (iii) welded wire option. No crack has formed in any specimens up until now and all design alternatives show similar performance to current TxDOT-design option. Based on observation and continuous monitoring, we are positive that the suggested design alternatives could be used for optimization of top mat reinforcement in the CIP portion of the bridge deck.

Moreover, we are continuing to monitor long-term prestress losses of precast, prestressed concrete panels and strain changes of top-mat reinforcements in a bridge in Houston. We are planning a site visit to Houston to look for and document any additional cracks that may have formed during the cold weather cycle.

In addition to bridge studies, we facilitated a testing program to conduct "Double Punch Tests" for fiber-reinforced concrete (FRC) studies. This research is aimed at providing a means of evaluating the effectiveness of high performance steel fibers in hardened concrete. Experiments show that the Double Punch Test is a reliable and reproducible test method, and has the potential to be adopted as a new ASTM standard for testing of FRC. The bulk of our FRC testing was carried out this past fall to provide sufficient data and statistics that show the robustness of the DPT test. In total, 120 specimens were tested. I guess we finally got some use out of that old 60-kip Baldwin!

Wireless Fatigue Monitoring - Jeremiah Fasl, Vasilis Samaras & Matt Reichenbach

After identifying extensive cracking at a fracture-critical bridge, the bridge owner decided to retrofit the bridge. Cracked areas were strengthened with steel plates bolted in place, following the highest safety standards (see figure). This retrofit will keep the bridge safe until the replacement bridge is completed. Strain gages are being used to monitor the impact of the retrofit. Just after the retrofit was finished, the project team instrumented two braces with accelerometers and found that long, slender braces have the potential to power the WSN strain nodes.

Regarding the WSN strain node, the team was able to successfully program the node and acquire strain data from a fatigue specimen. Within the next few weeks, the WSN strain node will be implemented in a bridge in Austin, TX. The WSN strain node will perform a rainflow analysis based on the recorded strain history so that the fatigue performance of the bridge can be evaluated.

On the strain gage durability side, new tests were developed to better understand the gage behavior in different deterioration stages and failure modes. The goal of these tests is to identify, based on strain history, when a gage is deteriorating or damaged. Moreover, new test series will examine the performance of different protection levels, as well as the impact on the gage durability due to the presence of a defect in the protective coating.

Passive Wireless Corrosion Sensors - Ali Abu Yousef

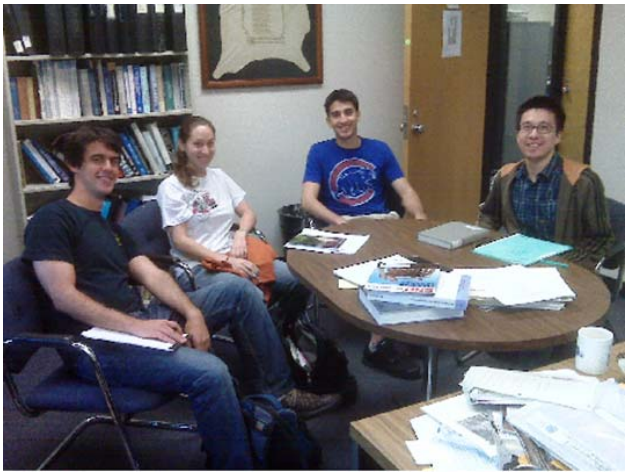
The sensor design relies on the wireless interaction between a sensor embedded in concrete and an external mobile reader. The sensor detects corrosion through an exposed sacrificial element that has electrochemical properties similar to that of steel reinforcement. In its simplest form, the sensor acts as a threshold sensor that triggers when corrosion initiates within concrete.

In the last few months we have been investigating a number of improvements to the embeddable sensor design. The adjustments will help extracting multi-threshold information, ensure the sensor durability, and significantly increase the speed of interrogation. Our Electrical Engineering partners are currently working on a reader technology that will reduce the time of interrogation by a hundred fold. In other words, it will take me fifteen minutes to interrogate sensors rather than the current four-hour mission.

The figure illustrates "figuratively" how the improvements in the sensor design lead to a CLEARER PICTURE of what is happening inside concrete

Anchor Testing in ASR Concrete - Anthony DeFurio, Alissa Neuhausen, Josh Ramirez, & Daniel Sun

Known by some around FSEL as the Anchor Men, we started working in November to determine the effects ASF-affected concrete has on anchor performance. So far, we have tested expansion anchors and undercut expansion anchors in concrete affected by ASR and concrete with no ASR damage. We have performed confined and unconfined tests to see both pullout and breakout failures. Soon we will be casting 2 new blocks and doing our best to promote as much ASR formation as possible. We can usually be found in our trailer to the east of BLDG 24 and will be moving a couch inside in the near future. To say the least, our project is going to be legen wait for it…



Monitoring Stresses in Prestressed, Precast Concrete Arches - Hossein Yousefpour & Joel Blok

During the past semester, we have primarily focused on laboratory tests of slender post-tensioned concrete members. These lab tests are primarily designed to determine the reliability of the vibrating wire gages in depicting structural behavior. The same gage model will be used to instrument the Fort Worth network arch bridge during construction; as such, the tests will help us to evaluate the arches' behavior with increased confidence. In the past few months, a significant amount of time was spent on testing the first specimen, and two additional specimens were constructed. In the interest of being able to repeat the tests in various loading modes, the tests were kept mostly in the elastic range. However, for those interested in watching when a 27-ft slender member buckles suddenly, December 16th was a remarkable day that you might have missed! With the cool graphs we're obtaining from the gages, we have demonstrated that the gages are very effective at depicting structural behavior, including impending buckling. After performing twenty-seven tests on our first specimen, we are well into testing our second specimen. Provided the bridge construction progresses according to plan, we should start our instrumentation on the job site in the near future.

Dec. 16, 2011 - Joel can scarcely contain his excitement as he ponders our latest and greatest contribution to science at FSEL: curved columns

Shear Cracking of Inverted-Tee Bent Caps - Eulalio Fernandez, Nancy Larson, & Alex Pena

Project conclusion: Decorating your setup with Christmas lights has been found to give good test results

Team IIT (Inverted-Inverted-Tee) is still chugging along, building beams and breaking records. With over sixteen beams constructed to date we have become quite good at tying rebar and casting concrete. We are planning on finishing up our testing program this spring/early summer after we have looked into a few final details.

This project is concerned with the effects of ledge loading on the shear capacity of a straddle bent cap. Supporting bridge girders on a ledge rather than the top of the cap induces tension in the web of the beam. We all know that concrete is not particularly fond of being pulled apart so Team IIT is investigating how changing the geometry of the ledge and the reinforcement affects this tension field and the performance of these caps. We will also be comparing them to the top-chord-loaded beams using strut-and-tie models.

Fatigue Testing of High Mast Illumination Poles - Kostas Belivanis

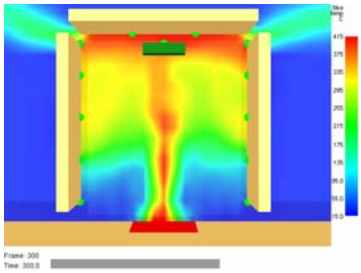
A high mast illumination pole from El Paso, TX, was removed from service and sent to FSEL for fatigue testing. The pole was removed from service due to the number of extensive cracks located along the weld of the base plate. TxDOT wanted to know how more cycles the pole could withstand before the cracks grew to the point of fracture; thus, the fatigue setup used previously in the lab was recreated.

The cracks on the pole were identified using ultrasonic and magnetic particle tests before the fatigue test was started. The test lasted approximately 30,000 cycles before a seal on the ram broke. The ram is currently being fixed so that the fatigue test can be restarted.

UT Fire Group - Kristopher Overholt, Andrew Kurzawski, & Jan-Michael Cabrera

The UT Fire Research Group is currently working on a number of projects related to wildland fires, firefighter safety, fire and acoustics measurements, and fires in nuclear gloveboxes.

When firefighters are overcome by the heat or smoke of a fire and become disoriented or trapped in a structure, it is crucial that there is a reliable means to alert other fire ground personnel to their need for assistance. This project seeks to establish a scientific basis for a single personal alert alarm signal for use throughout the U.S fire service. In addition, experiments at FSEL are being performed in the burn structure to characterize the fuel properties of little bluestem grass. These fuel properties are then used in full-scale wildland fire simulations to predict their impact on residential communities and firefighting resources. Experiments for other fire research projects include full-scale fire tests to characterize and detect flames using acoustic signals, and large-scale fires in mockup nuclear gloveboxes to verify the effectiveness of glovebox fire suppression devices



Seismic Behavior of Steel Beam-Column Connections - Sungyeob Shin

Panel zone is defined as the portion of column within the connecting beam depth in a steel moment frame. In order to investigate the effect of panel zone yielding on the behavior of steel moment frame under seismic loading, ten, full-scale interior connection specimens were designed. The following variables were considered: (1) column and beam sizes, (2) panel zone strengths, (3) column axial stresses, and (4) connection configurations. The main objective of this research is to evaluate the effect of panel zone strength, but the effect of weld access hole configuration and continuity plate and doubler plate weld details are of interest. In addition, finite element models will be analyzed using ABAQUS to validate the solutions against experimental data.

Column panel zone of WUF-W moment connection

Tubular Cross Frames - Anthony Battistini & Weihua Wang

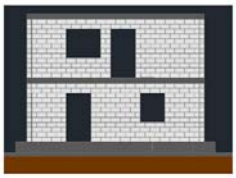
During the fall we performed many stiffness and fatigue tests on various connections for use in single diagonal cross frames. Unfortunately, the T-stem connection had a large stress concentration that led to a poor fatigue life. The steel casting provides a very stiff connection, and we are looking at some minor changes to improve its fatigue life. We are also testing knife-plate connections as well as a more conventional double angle connection. Large-scale testing of the cross frames has begun on the main lab floor in order to determine the stiffness of the entire brace and the ultimate failure mechanism. These results are being used to validate finite element models, which will then be used to examine other geometries.

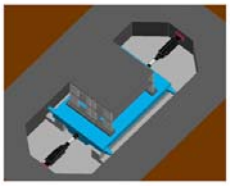
We on the steel team like to wear the same uniforms

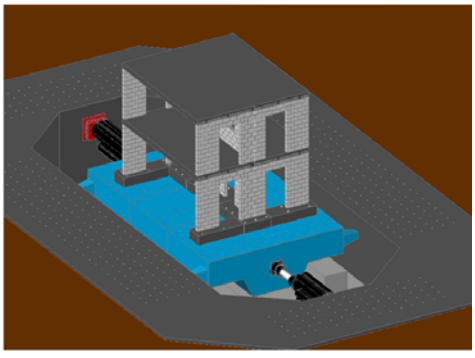
Seismic Design of Reinforced Masonry - Jaime Hernandez Barredo, Saleh Alogla & Farhad Ahmadi

The NIST-masonry research will produce basic information on the nonlinear flexure and shear-dominated behavior of reinforced masonry shear walls as well as data on the dynamic performance of full-scale masonry wall systems under earthquake loads. In particular, the research will produce fundamental data on the relationship between key design variables, namely, the wall aspect ratio, applied axial load, and reinforcement quantity, and shear wall performance, including the available ductility, plastic-hinge length, and shear capacity. The research will result in safer and more cost-effective reinforced masonry construction in seismic zones. It will lead to the improvement of current design provisions. This project is intended to produce much-needed experimental data to better understand the seismic performance of reinforced masonry shear-wall structures and to develop improved design methodologies, detailing requirements, and analytical methods for the design and performance assessment of these structures.

A total of forty-four quasi-static masonry wall segments have been tested at UT and WSU. Also, a two-story shaking table specimen, with an irregular configuration of door and window openings, scheduled for testing in on the large high-performance outdoor shaking table at UCSD in June 2012.

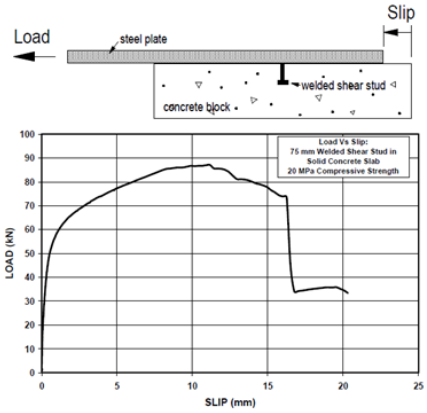






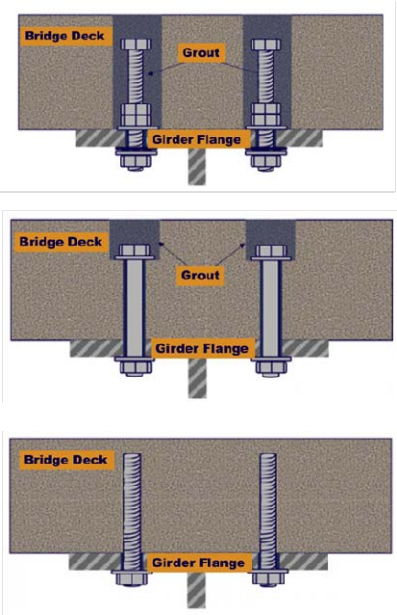
UCSD two-story specimen on the LHPOST shaking table

Elevated Temperature Performance of Shear Connectors for Composite Beams - Sepehr Dara



The objective of this research is to develop experimental data, analytical models, and design models for the performance of composite shear connectors at an elevated temperature. In past studies, there has been extensive experimental research on shear connector behavior at normal temperatures, there has been virtually none at elevated temperatures. An extensive series of shear connector tests are planned, in order to provide data on a number of key variables of importance. The major variables that will be considered include the type of concrete floor system (solid slab versus formed metal deck slab), the effect of temperature and temperature gradient in the slab, and the effect of using lightweight in comparison with normal weight concrete. The experiments will be supplemented by computational simulations using finite element program ABAQUS and by the development of analytical and design models for shear connector response.

Strengthening Continuous Steel Bridges with Post-Installed Shear Connectors - Kerry Kreitman & Hemal Patel



Three types of potential post-installed shear connectors developed in a previous FSEL project

The goal of this project is to increase the load rating of continuous, noncomposite steel girder bridges built around the 1960s by post-installing shear connectors to create composite action. Various types of shear connectors were investigated in a previous FSEL project that focused on bridges with simply supported spans. Our task is to expand this strengthening technique to continuous bridges, where the negative moment regions are strengthened to a lesser degree by composite action as the concrete cracks. Additionally, we will be performing further fatigue testing on the three types of bolted shear connectors that showed the best structural performance in the previous project.

As this project is in its first year, we are focusing on a comprehensive literature review and on becoming familiar with modeling tools like SAP and ANSYS. Fatigue testing of the connectors will likely begin later this semester or over the summer.

Air-Coupled NDT Methods - Yi-Te Tsai & Xiaowei Dai

Parabolic dish and microphone for air-coupled sensing

According to the U.S. Department of Transportation, 161,892 (26.9%) bridges were categorized either as structurally deficient or functionally obsolete as of December 2008. This indicates that effective and efficient bridge inspection is needed for aging bridges and other infrastructures across the nation. Stress-wave-based impact-echo tests (IE) that work with contact sensors have been proven to be capable of effectively evaluating the health condition of concrete structures. However, the test speed is slow because of necessary surface preparation at each test location. The objective of our research is to develop a fully air-coupled non-contact technology that can improve test speed significantly and achieve expected effectiveness. At this point, we are able to obtain clear airborne signals radiated from structure surface with an air-coupled sensor (microphone) plus a parabolic reflector. Currently we are working on the air-coupled source and trying to maximize amplitudes of the stress waves generated in concrete structures.

NDE Evaluation of ASR/DEF Damaged Bent Caps - Eric Giannini & Brian Hanson

ASR and DEF can cause extensive expansion and cracking in concrete. Despite this deterioration, most RC structures experience little or no loss of load-carrying capacity because of confinement by the reinforcement. However, fracture of shear reinforcement has been found in some Japanese ASR-affected structures, possibly jeopardizing the structural integrity.

This project seeks to improve the evaluation of affected structures, incorporating non-destructive testing (NDT), and to investigate the implications of stirrup fracture. Although NDT measurements are unlikely to provide a clear indication of structural performance, they can provide qualitative information about the condition of the concrete.

This semester, the project will focus on the results of flexural tests of all three large beam specimens cast for this project and shear tests of Dean's three remaining beams.

The photo on the left was taken after the load test, with the red lines marking load-induced cracks. The photo on the right was taken before the load test!

Spliced Prestressed Concrete I-Girders - Andy Moore, Chris Williams, James Felan, David Wald, & Josh Massey

The spliced girder team has been hard at work building both small- and large-scale specimens. We have now cast ninety of the "small"-scale, 7-in. thick panel specimens (the strongest of which failed at a load of 1,600 kips). These are meant to model the compressive strut which forms in the web of a prestressed girder with a post-tensioning duct. Soon we will be casting our first series of 9-in. thick panels, which will wrap up the panel-testing program. We are also currently working with Hamilton Forms to construct custom formwork for our full-scale specimens that will be tested in shear. These girders will be pre- and post-tensioned Tx-62 girders with a 7.5-ft end-block to accommodate the post-tensioning anchorages.

Retrofit, Retrofit, Retrofit - Guillermo Huaco and Wanching Huang

Using innovative materials and/or devices offers an interesting approach for strengthening and/or retrofitting damaged RC members in buildings or bridges. By assessing the cost to demolish and rebuild a new column with the cost to repair a damaged one, repair may be less expensive than replacement. However, there is very little research regarding the evaluation of structural vulnerability when innovative materials or devices are used. Laboratory tests are being conducted on strengthened elements and substructures. The test program includes the use of CFRP (Carbon Fiber Reinforced Polymer) for strengthening or for creating ductile elements. Mechanical couplers are used to provide continuity to the reinforcement. In locations where the rebar has buckled and the concrete has crushed, mechanical couplers can be used to replace the buckled bars.

"Just be perseverant and you will get success"

CFRP wrapping on one column (above) and mechanical splices installed to place the new rebar into another column (right)

New Prestress Loss Provisions - Dean Deschenes, José Gallardo, & David Garber

Service load testing of a 0-6374 specimen

In TxDOT Project 0-6374, long-term prestress losses in pretensioned concrete beams are being examined experimentally. Sixteen Type C and fourteen Tx46 girders were fabricated at three major precast manufacturers in Texas. Internal instrumentation was installed in select beams to monitor the internal state of strain (and corresponding prestress losses) over time. The beams feature full-scale cross-sections, yet are small enough to be transported into the lab for service-load testing.

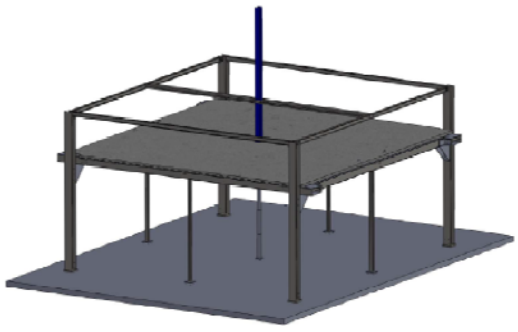
An assembled database (containing nearly 150 specimens), a parametric study and testing of the thirty fabricated girders will help to determine the conservatism and accuracy of multiple prestress loss estimation procedures. In the past few months, nearly half of the thirty fabricated girders were service-load tested. The cracking moment of each beam was carefully measured and used to back-calculate the long-term prestress losses. The results from these service-load tests, as well as the results from the remaining tests, will be added to the experimental database to support future recommendations for prestress loss estimation.

Shear Strengthening of Concrete Elements Using CFRP Sheets and Anchors - Jose Garcia, Changhyuk Kim, & Sun Wei

These beams are failing at a load of about 10 kips

The final stage of the project will be to develop guidelines for quality control of CFRP application. These guidelines will focus on proper specimen preparation, correct CFRP application, and CFRP anchor installation. We are developing a quality control test using 6-in. by 6-in. by 24-in. unreinforced concrete beams. These beams will also be used to study the bond mechanism of the CFRP anchor to the CFRP sheet. We will also help train TxDOT employees in CFRP application. Finally, we will supervise a CFRP application procedure on an in-use bridge girder in the San Antonio area.

Progressive Collapse Capacity of Composite Floor Systems - Sean Donahue & Michalis Hadjioannou



Model of test frame and specimen

Current practice in US progressive collapse design depends primarily on a building's floor system to develop membrane action through tie forces, thus supporting the damaged building sections. Though many experts in the field believe that the steel decking in a composite floor system can generate these tie forces, current US provisions do not utilize this strength, as there has not been enough empirical research into the performance of such systems under collapse conditions. Detailed computational analysis, done at UT and backed up by our research partners at Imperial College in London, has suggested that this system has significant residual strength that can be counted on in a collapse scenario. However, many questions still remain regarding the ductility of the components and the exact failure sequence of the system. Preparations are currently underway to build a test frame capable of simulating the response of a composite floor system in the event of a column loss scenario, which should allow us to answer these questions, and perhaps allow the design of more robust buildings.

Elevated Temperature Material Properties - Jinwoo Lee

There is an increasing interest in the US in developing engineered approaches to structural fire safety of buildings as an alternative to conventional code-based prescriptive approaches. In steel buildings, one of the key elements of an engineered approach to structural fire safety is the ability to predict the material properties during and after fire.

The major purpose of this project is to figure out the mechanical properties of ASTM A992 steel for the following use.

-Provide the fundamental mechanical properties for analyzing the building behavior after fire including earthquake event.

-Evaluate the structural integrity of buildings due to fires of varying severity and different causes and provide basic data for the building design code for fire-resistant design

The experimental tests were performed by simulating the real fire situation: heating up to from room temperature to 1000°C with an increment of 100°C and then cooling down with variety condition of Cooled-In-Air(CIA), Cooled-In-Blanket(CIB), and Cooled-In-Water(CIW) to obtain the practical application at industrial and academic fields for evaluating the steel structures after fire.

Coupons after cooling down with CIA, CIB, CIW

The results of this research will include the elastic modulus, yield strength, and stress-strain curve at multiple elevated temperatures. The material properties will prove useful in the evaluation of the steel structure after fire events.

Creep Buckling Due to Fire - Mohammed Ali Morovat & Victoria Segrest

This research focuses on studying the time-dependent buckling behavior of ASTM A992 steel columns at elevated temperatures. The objective of this project is to better understand the phenomenon of creep buckling and to develop methods to predict creep buckling behavior. Material characterization tests have been conducted at temperatures up to 700 °C to evaluate tensile and creep properties of ASTM A992 steel at elevated temperatures. W4×13 wide flange columns will be tested under a pin-ended condition. The knife-edge, being used as a pin, is made out of Viscount 44, a hardened tool steel with high yield strength, so that it can be used for several tests with negligible wear. As seen in the pictures, the test setup is ready and the creep column tests are scheduled to be started this spring.

Congratulations to the 2011 FSEL Fall Graduates!!

Fall 2011

- Alejandro Avendaño (PhD)
- Guanyu Hu (PhD)
- Yungon Kim (PhD)
- Trang Nguyen (MS)
- Katie Schmidt (MS)
- Zach Webb (MS)
- Michelle Wilkinson (MS)
- Chris Williams (MS)

BUILDING24 COMMITTEE

*Committee Vision: Increase **productivity** at Ferguson Laboratory through improved **communication** and **collaboration** of students, staff, and faculty*

JNT Golf Tournament - May 16

BASTROP, TX Have you started looking at possible summer plans once finals are over? Well, wait to leave until after May 16th so you can participate in the annual structural engineering department golf tournament. The 19th Annual J. Neils Thompson Golf Tournament will be held at the Pine Forest Golf Course (Bastrop) on the Wednesday immediately following finals, May 16. The tournament celebrates the end of the semester and honors J. Neils Thompson, who was the lead developer of UT's civil engineering research program as well as a scratch golfer.

The format and rules of this tournament create a fun atmosphere for all skill levels (more than 25% of the participants have never played golf before). Eighty students, professors, staff, and industry representatives have participated in each of the past four tournaments.

The tournament format is a "shotgun start, four-person best ball scramble." With such a scramble, all four players hit from the same spot and use the best shot of the group for their next shot (i.e. three players pick up their ball and shoot from the "best ball"). Thus, anyone has the chance to make a difference.

The tournament is a lot of fun and more details will be released closer to the tournament. Not only do you get to spend time with your fellow classmates, the tournament offers an opportunity to network with professionals who sponsor the outing to help reduce the cost for students. All skill levels are encouraged to participate and we make sure to add some "special rules" to make the round of 18 enjoyable for everyone. More details will follow during the semester.

Special points of interest:

- Lab Clean-up, February 15-16
- Recruitment Weekend: February 17-18
- Annual Picnic and Softball Game: May TBD
- JNT Golf Tournament: May 16, Pine Forest Golf Course, 12pm Start

Use kicks to get closer to the hole

Last year's winners: David Garber, Neil Satrom, Steven Blair, & Stephen Foster

Use string to save a stroke

Everyone has a chance to sink the winning putt!

Information about the Newsletter

The goal of this publication is to keep those working at FSEL aware of the status of ongoing projects around them. In addition to projects, we may also highlight special events, people, or news of interest. The newsletters will come out once a semester, three times a year.

In this first issue of 2012, twenty-five research projects at FSEL are summarized. Hopefully you will learn something new about each project so as to initiate more discussions with your fellow researchers.

Feedback
Jeremiah Fasl
E-mail: jdfasl@mail.utexas.edu